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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Walter Doll

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EXAMINER

ZHANG, JUE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/552,974	DOLL ET AL.	
	Examiner	Art Unit	
	JUE ZHANG	2838	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 June 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19 and 22-33 is/are rejected.
- 7) ☒ Claim(s) 20 and 21 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 October 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>10/11/2005</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 3, 5, 19, and 23 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Applicant recites the limitation "the second conversion means" in claims 3, 5, 19, and 23. There is insufficient antecedent basis for this limitation in the claims since there is no limitation "second conversion means" claimed in claim 1. Therefore, the metes and bounds of the claim are unclear. Applicant's correction is required.

For the claim examining purpose the limitation is interpreted as a conversion means capable to convert the DC power from input to output (that the second claims 3, 5, 19, and 23).

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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4. Claims 1-7, 19, 25-27 are rejected under 35 U.S.C. 102(b) as being anticipated by Nanno et al. (US Patent No. 5553294, hereinafter '294).

Claims 1, 25, '294 teaches a power management system for supplying power to an output circuit and a method of managing the supply of power to an output circuit in a system that includes a plurality of rechargeable batteries, (Fig. 1-15 and corresponding texts) comprising:

a plurality of rechargeable batteries;

first conversion means (e.g., 311) for converting a supply voltage to a battery voltage to enable charging of one or more of the plurality of rechargeable batteries (e.g., 31L, 31R)(Fig. 2); and

switch means (e.g., SRO) to enable a selected battery of the plurality of rechargeable batteries to be connected to the output circuit to enable the selected battery to be discharged through the output circuit (Fig. 2 and corresponding text).

For claim 2, '294 teaches the limitation of claims 1 and 25 as discussed above. '294 further teaches that the switch means is connected to the first conversion means to enable charging to the selected battery (Fig. 2 and corresponding text).

For claim 3, 26, '294 teaches the limitation of claims 1 and 25 as discussed above. '294 further teaches that second conversion means (e.g., 315) connected between the output circuit and the switch means for converting the voltage of the selected battery to a voltage for use by the output circuit thereby discharging the selected battery (Fig. 2 and corresponding text).

For claim 4, '294 teaches the limitation of claim 1 as discussed above. '294 further teaches that a rechargeable battery of the plurality of rechargeable batteries is chosen, one at a time, in order to be charged or discharged (Fig. 2 and corresponding text).

For claim 5, '294 teaches the limitation of claim 1 as discussed above. '294 further teaches that the first conversion means acts as the second conversion means (e.g., the output of 313 and 315 is connected to the output of 311 when switch SLI is closed to supply the power to the output circuit (Fig. 2 and corresponding text).

For claim 6, '294 teaches the limitation of claim 1 as discussed above. '294 further teaches that the switch means comprises a plurality of switches enabling connection of a respective rechargeable battery of the plurality of rechargeable batteries to the first conversion means and to the output circuit (Fig. 2 and corresponding text).

For claim 7, '294 teaches the limitation of claim 1 as discussed above. '294 further teaches that a control unit for controlling the switch means to either enable charging or discharging of a rechargeable battery of the plurality of rechargeable batteries (Fig. 2 and corresponding text).

For claim 19, '294 teaches the limitation of claim 1 as discussed above. '294 further teaches that the second conversion means enables discharging of a battery of the plurality of rechargeable batteries such that charge in the selected battery of the plurality of rechargeable batteries is forwarded to the output circuit (Fig. 2 and corresponding text).

For claim 27, '294 teaches the limitation of claim 26 as discussed above. '294 further teaches the step of controlling the switch means to enable the charging or discharging of a selected battery of the plurality of rechargeable batteries on the basis of information stored in a register on each of the rechargeable batteries in the plurality of rechargeable batteries (Fig. 1-6 and corresponding text).

For claim 28, '294 teaches the limitation of claim 27 as discussed above. '294 further teaches the step of controlling the switch means to enable the charging or discharging of a selected battery of the plurality of rechargeable batteries on the basis of information stored in a register on each of the rechargeable batteries in the plurality of rechargeable batteries (Fig. 1-6 and corresponding text).

For claim 29, '294 teaches the limitation of claim 28 as discussed above. '294 further teaches the step of multiplexing and measuring parameters, such as battery voltage, battery charge and battery current, pertaining to each rechargeable battery in the plurality of rechargeable batteries for storage as digital values in the register (Fig. 1-6 and corresponding text).

For claim 30, '294 teaches the limitation of claim 29 as discussed above. '294 further teaches the step of maintaining a record in the register on the state of charge of each rechargeable battery in the plurality of rechargeable batteries (Fig. 1-6 and corresponding text).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

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obviousness rejections set forth in this Office action:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nanno et al. ('294), in view of Maki (US Patent No. 6541980, hereinafter '980).

For claim 8, '294 teaches the limitations of claim 7 as discussed above. '294 further teaches that one terminal of each rechargeable battery in the plurality of rechargeable batteries to enable the voltage signals pertaining to each battery to be forwarded to an analogue to digital converter (318).

'294 does not explicitly teach that a multiplexer means is used to select one terminal of each rechargeable battery in the plurality of rechargeable batteries for to be forwarded to the A/D converter.

However, in an analogous art, '980 teaches a battery voltage monitoring device (Abstract; Fig. 1 and corresponding text) which uses multiplexer means (e.g., 1 or 2) to select one terminal of each rechargeable battery in the plurality of rechargeable batteries for the voltage to be measured by an A/D converter (5). Therefore, the subject matter as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the multiplexer means to select one terminal of each rechargeable battery in the plurality of rechargeable batteries of '294, as taught by '980, in order to have measured the selected voltage of the batteries using the A/D converter, because '980 has demonstrated that it is a preferred method in order to have measured the selected battery voltage from multiple of batteries using an a/d converter.

For claim 9, '294 and '980 teach the limitations of claim 8 as discussed above. '294 further teaches that a shunt impedance means connected to the other terminal of each battery in the plurality of rechargeable batteries to measure the charge current of each battery, represented as a voltage drop across the shunt impedance means e.g., the input impedance of 312) (Fig. 2 and corresponding text).

7. Claims 10-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nanno et al. ('294), in view of Maki (US Patent No. 6541980, hereinafter '980), further in view of Arai et al. (US Patent No. 6891438, hereinafter '438).

For claim 10, '294 and '980 teach the limitations of claim 9 as discussed above. '294 or '980 do not explicitly teach that the shunt impedance means is connected in parallel to a shunt switch to short circuit the shunt impedance means when the shunt impedance is not in use.

However, in an analogous art, '438 teaches a current sensing circuit (Abstract; Fig. 1 and corresponding text) which uses current sensing resistor (24) and a by-pass switch (26). '438 further teaches that when the current sensing resistor is not been used for current sensing the by-pass switch is closed to bypass the sensing resistor (24) so that it does not dissipate power and reduce the efficiency of the circuit (Abstract). Therefore, the subject matter as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made to have used a bypass switch to bypass the current sensing shunt impedance of '294 and 980 when the current sensing impedance is not in use, as taught by '438, in order to have reduced the power dissipate and improve the efficiency of the circuit, because '438 has demonstrated that it is a

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preferred method in order to have reduced the power dissipate and improve the efficiency of the circuit.

For claim 11, '294, '980, and '438 teach the claimed limitations except for explicitly teaching an amplification means connected between the shunt impedance means and the multiplexer means to amplify the voltage drop across the shunt impedance means to the input voltage range of the analogue to digital converter. However it is known to one in art at the time of invention to use an amplifier to amplify the sensed signal to the input voltage range of the AD converter in order to improve the voltage measurement accuracy. Therefore, the subject matter as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made to have used an amplifier to amplify the sensed current signal of '294, '980 and 438 to the input voltage range of the AD converter, as it has been known to one in art, in order to improve the voltage measurement accuracy.

For claim 12, '294, '980, and '438 teach the limitations of claim 11 as discussed above. '294 further teaches that the analogue to digital converter measures individual battery voltage of any one of the rechargeable batteries in the plurality of rechargeable batteries and converts the measured voltage to a digital value (i.e., after the analog signal being converted to digital data(Fig. 1-2 and corresponding text).

For claim 13, '294, '980, and '438 teach the limitations of claim 11 as discussed above. '294 further teaches that the analogue to digital converter measures the voltage drop across the shunt impedance means and converts the measured voltage into a digital value (Fig. 1-2 and corresponding text).

For claim 14, '294, '980, and '438 teach the limitations of claim 13 as discussed above. '294 further teaches that a register for storing information pertaining to each battery (Fig. 1-6 and corresponding text).

For claim 15, '294, '980, and '438 teach the limitations of claim 14 as discussed above. '294 further teaches that said information comprises any one or more of charge status of each battery in the plurality of rechargeable batteries, error status of each battery in the plurality of rechargeable batteries or a flag identifying whether a battery in the plurality of rechargeable batteries has been disabled from being charged or discharged (Fig. 1-6 and corresponding text).

For claim 16, '294, '980, and '438 teach the limitations of claim 15 as discussed above. '294 further teaches that the control unit (e.g., 306)(Fig. 2 and corresponding text) is in communication with the register and with the analogue to digital converter for processing signals and data from the analogue to digital converter and from the register (Fig. 1-6 and corresponding text).

For claim 17, '294, '980, and '438 teach the limitations of claim 16 as discussed above. '294 further teaches that the control unit periodically senses the presence of a voltage at the input to the switch means (Fig. 1-6 and corresponding text).

For claim 18, '294, '980, and '438 teach the limitations of claim 17 as discussed above. '294 further teaches that the control unit selects a battery of the plurality of rechargeable batteries to be charged or discharged on the basis of information stored in the register pertaining to a particular battery of the plurality of rechargeable batteries (Fig. 1-6 and corresponding text).

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8. Claims 22, 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nanno et al. ('294), in view of Afzal et al. (US Patent No. 5635814, hereinafter '814).

For claim 22, 24, '294 teaches the claimed invention except for the first conversion means including an inductive means, or the supply voltage is derived from an inductive means and rectified into a direct voltage to be applied to the inductive means of the first conversion means.

'814 disclose a battery charging device with the supply being derived through an inductive device L1 and rectified by bridge rectifier 410, then feed to the transformer of the charging circuit (Abstract; Fig. 8 and corresponding text). '814 demonstrated that the circuit is a suitable method for charging rechargeable battery. Therefore, the subject matter as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the charging circuit of 814 in the first conversion circuit of '294 as demonstrated by '814, in order to have converted the input supply to the power used for charging the rechargeable battery, because '814 has demonstrated that it is a suitable method in order to have charging the rechargeable battery.

9. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nanno et al. ('294), in view of Kernahan et al. (US PG Pub No. 20040095020, hereinafter '020).

For claim 23, '294 teaches the claimed invention except for the second conversion means including an inductive means (i.e., the DC to DC converter). '020 discloses a power converter circuit with a inductor 15 for converting the battery voltage to a regulated output voltage for supplying power to load (Fig. 1). Therefore, the

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subject matter as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the DC/DC converter circuit of '020 for the second conversion circuit of '294, as demonstrated by '814, in order to have converted the battery voltage to the output voltage for supplying power to the load, because '020 has demonstrated that it is a suitable method in order to have converted battery voltage to output voltage for supplying power to load.

10. Claims 31-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nanno et al. ('294),

Claim 31, '294 teaches the claimed invention except for providing an optimum range, as a percentage value of the state of charge, within which each rechargeable battery in the plurality of rechargeable batteries is charged and/or discharged.

It would have been obvious to one having ordinary skill in the art at the time of the invention was made to have provided an optimum range, as a percentage value of the state of charge, within which each rechargeable battery in the plurality of rechargeable batteries is charged and/or discharged, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. In re Aller, 105 USPQ 233.

For claim 32, '294 teaches the limitation of claim 31 as discussed above. '294 further teaches the step of disabling charging of a battery of the plurality of rechargeable batteries where the charge of that battery of the plurality of rechargeable batteries is above a first percentage limit of the state of charge e.g., S5 or S11)(Fig. 3 and corresponding text).

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For claim 33, '294 teaches the limitation of claim 31 as discussed above. '294 further teaches the step of terminating the discharging of a battery of the plurality of rechargeable batteries where the charge of that battery of the plurality of rechargeable batteries is below a second percentage limit of the state of charge (e.g., S40)(Fig. 4C and corresponding text).

Allowable Subject Matter

11. Claims 20-21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

12. The following is a statement of reasons for the indication of allowable subject matter:

Claim 20, the prior art does not fairly teach or suggest that the inverter device as claimed in claim 19, further having the output circuit forms part of an implantable device.

Claim 21 is allowable for being dependent to allowable claim 20.

Examiner's Note:

13. Examiner has cited particular columns and line numbers in the references applied to the claims above for the convenience of the applicant. Although the specified citations are representative of the teachings of the art and are applied to specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested from the applicant in preparing responses, to fully consider the

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references in their entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the Examiner.

14. In the case of amending the claimed invention, Applicant is respectfully requested to indicate the portion(s) of the specification which dictate(s) the structure relied on for proper interpretation and also to verify and ascertain the metes and bounds of the claimed invention.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JUE ZHANG whose telephone number is (571)270-1263. The examiner can normally be reached on M-Th 7:30-5:00PM EST, Other F 7:30AM-5:00PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Akm Ullah can be reached on 571-272-2361. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should

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you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Akm Enayet Ullah/
Supervisory Patent Examiner, Art
Unit 2838

JZ